



2. **Add ground post extensions** to increase height of short tunnels. Many older tunnels were

7. **Size ventilation and circulation systems properly.** Ventilation flow rates are expressed as cubic feet per minute per square foot of growing area. Good mechanical ventilation requires the right size fans and/or openings. With passive ventilation it's just openings. An old article by John Bartok, former UConn Extension Ag Engineer, states that roof vent areas should equal the combined sidewall vent area, and each should be at least 15% of the floor area. That seems like a lot, and it suggests that many high tunnels have insufficient passive ventilation. Guidance for circulation flow rates is 25% of the overall growing volume per minute. See Chris Callahan's [blog post on greenhouse ventilation](#) for summary of how to size these systems.

8. **Have furnaces professionally serviced** before the heating season. Quoting John Bartok once again: "Keeping the greenhouse heating system in good repair and operating condition can save money in several ways. Fuel consumed may be reduced as much as 20 percent. Heat distribution may be more uniform resulting in a lower thermostat setting and better plant growth. The system is less likely to fail causing crop losses." Here's a [checklist](#) for heating system maintenance.

9. **Seal gaps to avoid heat loss.** Whether you heat a high tunnel with solar energy alone or with supplemental heat, avoiding heat loss at night and on cold days is a good thing. I've seen many tunnels with gaps around doors and roll up sides, and louvers that don't seal. Some growers use old drip tape or used bicycle tire tubing as weatherstripping in door frames. Some brands of ventilation louvers work better than others (see Chris Callahan's blog post, above). And it's standard to have an extra panel of plastic cover left in place that overlaps with each end of the roll-up side, to create a better seal at the corners of a tunnel.

10. **Prepare for climate extremes.** The weather is getting whackier. Large, sometimes rapid, fluctuations in temperature and precipitation make tunnel growing more and more attractive compared to the field, but tunnels are not immune from extreme weather impacts. Options for coping include perimeter drainage, perimeter insulation, shade cloth, shade spray or paint. And don't forget to plan for worst case winds and heavy snow load to [avoid collapse](#) of tunnel structures.

11. **Thoroughly mix soil to re-distribute salts** that have moved up to the surface. A SARE-funded [research project](#) conducted by UMaine, UNH and UVM found that during winter months, high tunnel soil can become strongly stratified in terms of soluble salt levels. In two test sites, there was a 10-fold difference in soluble salts between measurements from the top inch of soil vs. a sample 2-3 inches deep. This has implications in terms of soil sampling and seed germination. Although no-till has many upsides, it may not be appropriate in tunnels. Mix your tunnel soil well before testing it or sowing crops.

12. **Soil test**, well in advance of planting seeds and transplants. For in-ground vegetable production we recommend the use of both the saturated media extract (SME) and the regular field soil test (modified Morgan's extract) to assess the levels of soluble and reserve nutrients, respectively. The [UMaine Testing lab](#) offers a "combined high tunnel package" for \$30 that includes both tests. SME also measures soluble salts and soluble forms of nitrogen.

The SME was developed as a potting soil test, it should be used to test your potting soil mixes well in advance of planting to avoid problems. The cost is \$18 at UMaine, and many other labs also offer this test.

13. **Apply plenty of K** but avoid fertilizers with large granules. The same study cited above found that high tunnel tomatoes are heavy consumers of K, such that 500-600 lbs./acre of applied K minimized yellow shoulder and maximized yields. Sources of potassium sulfate, a common tunnel fertilizer, vary widely in particle size, and this, in turn affects solubility and release rate.

There are many [biological control options](#) for tunnels and greenhouses. These should be preordered in many cases. You can store ladybugs in a fridge if you have a history of aphid problems.

perhaps from one representative area of a tunnel. How will data be recorded? Maybe old-fashioned clipboards with harvest tally forms, or dry-erase boards, or iPads with spreadsheets. Set up a system that works for your farm.

**Bonus points:** Take time to celebrate. The world's a crazy place and you and your team are doing good by growing plants that help people stay healthy in body and spirit! It's important to acknowledge this meaningful work--however you choose to do that.